

## **Measure 2: General Purpose Traffic Operations**

### **Monitoring Objectives**

The purpose of monitoring general purpose traffic operations is to measure the impacts of tunnel closure on general purpose traffic in the following areas:

- Measure the change in general purpose traffic volumes
- Measure the change in general purpose vehicle travel times
- Review traffic operations trends during the tunnel closure period and make revisions as needed

This report examines the trend in these measures between the before tunnel closure condition, and the periods measured after the tunnel was closed. The measurement periods were January 2005 (before), and October 2005 and May 2006 (after).

### **Methodology**

Three data collection efforts were used to evaluate the effect that tunnel closure has had on CBD traffic operations: tube counts; travel time studies; and turning movement counts. Traffic counts using pneumatic tubes were employed to collect traffic volumes at selected locations throughout the Seattle CBD. These automated counting machines yield hourly and daily directional volumes. Travel time studies were also conducted to quantitatively assess changes in travel time for general traffic on several corridor segments before and after the tunnel closure. These corridors included segments along First Avenue, Second Avenue, Fourth Avenue, Fifth Avenue, Stewart Street, Olive Way, Pike Avenue, Spring Street and Cherry Street. Turning movement counts were also collected at 23 locations. The pre-tunnel closure data was collected in January 2005. The first installment of post tunnel closure data was collected in October, 2005. The most recent post tunnel closure data was collected in May 2006.

Travel time runs were used to estimate changes in general purpose travel time due to the general purpose travel restriction placed on Third Avenue. The “floating car” travel time method was used to collect this data. This method consists of probe cars driven along the routes, where the driver records the time it takes to traverse the route moving within the flow of general traffic. See Figures 3A, 3B, and 3C for a comparison of each of the twelve distinct travel paths, illustrated by time of day.

Tables 1A through 4 provide a comparison of pre- and post-tunnel closure PM peak hour volumes and Average Weekday Daily traffic (AWDT).

Table 6 illustrates vehicle turning movements for the AM peak, midday and PM peak time period for each of the study locations. The figure highlights turning movement volumes that changed by more than 100 vehicles per hour (vph). The underlined volume represents the before condition turning movement count that changed by more than 100 vph, and the highlighted number is the turning movement count measured that has seen a change of 100+- vph during one of the tunnel closure data collection periods. Blue highlight represents volumes decreased and yellow highlight represents that volumes increased.

### **Summary of Traffic Impacts**

With the implementation of the traffic revisions instituted as tunnel closure mitigation, it was anticipated that traffic circulation and travel through town would be impacted. The overall effectiveness of these traffic mitigation strategies implemented to address these concerns could only be proven through actual operating experience.

Based on the first two sets of post tunnel closure traffic statistics, travel in the morning peak and off-peak periods has been mitigated adequately in terms of sustaining pre-tunnel closure travel times in all but a

few cases. During the PM peak period, there are some areas that have experienced increases in travel times. There have also been some changes in travel times between the last issued report (January 2006) and this report (July 2006) which are noted in the attached tables.

**Table 1A: General Purpose Travel Time - AM Peak Period (7 – 9 am)**

Report Date	Corridor	Observation
Jan '06	SB 4th Ave from Washington St. to Royal Brougham	Travel time increased by almost 1 minute.
July '06		Travel times are 23 seconds longer than pre-tunnel closure condition
Jan '06	Olive from 3rd Avenue to Boren	Travel times improved by over 1:18, a possible result of the signal timing changes and transit lane investment.
July '06		Travel times are 50 seconds faster than pre-tunnel closure condition
Jan '06	Pike Street	Travel time improved by nearly 1 minute.
July '06		Travel times are the same as pre-tunnel conditions
Jan '06	All other segments	During the AM period were less than 1 minute difference, and represent no significant change in operation.
July '06		There are no new variations in AM travel time data that appear to be significant

**Table 1B: General Purpose Travel Time - Midday Period (1 – 3 pm)**

Report Date	Corridor	Observation
Jan '06	Cherry Street	Travel time increased by 1:40 based on a sample of 6 travel time runs – this will be monitored to see if any action is required. Construction of a high rise in the area may have contributed to these results.
July '06		Travel time is 1:22 longer than the pre-tunnel closure condition
Jan '06	Pike Street	Improved by nearly 1 minute.
July '06		Travel time improvements reported in January are no longer observed. Travel times are 17 seconds faster than pre-tunnel closure conditions
July '06 (new)	2 <sup>nd</sup> Avenue	2 <sup>nd</sup> Avenue travel times from Stewart to James are trending longer in May '06 data. Travel times are 48 seconds longer than pre-tunnel closure condition.
July '06 (new)	SB 4 <sup>th</sup> Avenue S	Travel times are trending faster and are 1:07 better than the pre-tunnel closure condition.
July '06 (new)	Spring Street	Travel times are trending faster and are 52 seconds better than the pre-tunnel closure condition.
Jan '06	All other segments	During the midday period were less than 1 minute difference, and represent no significant change in operation.
July '06		There are no new variations in midday travel time data that appear to be significant

**Table 1C: General Purpose Travel Time - PM Peak Period (4 – 6 pm)**

Report Date	Corridor	Observation
Jan '06	Stewart Street	Travel times increased the most –from 3:44 (min:sec) to 6:15 for a total of 2:31. This is attributed to the increased volumes of both bus and general purpose traffic on Stewart and to additional turning traffic from Stewart to 2nd Avenue. Several actions have been taken to address this issue. These measures include additional curb use restrictions, transit re-routes, signal timing changes, and the upgrade of signal equipment. This is being closely monitored to determine if additional treatments will be required.
July '06		Travel times have mostly normalized and are 35 seconds longer than the pre-tunnel closure condition
Jan '06	2nd Avenue	Travel time has increased by over 1 minute due to increased congestion between Stewart and Spring Streets.
July '06		Travel times have improved significantly, and more than normalized and are measured as 1:17 faster than the pre-tunnel closure condition
Jan '06	5th Avenue	Travel times increased from 4:46 to 6:28, an additional 1:45 min:sec.
		Travel times have begun to normalized and are 48 seconds longer than the pre-tunnel closure condition
Jan '06	Spring Street	Travel time increased by approximately 1 minute.
July '06		Travel times have normalized and are within a few seconds of the pre-tunnel closure condition
July '06 (new)	SB 1 <sup>st</sup> Avenue	Travel time has increased significantly by 1:53 from the pre-tunnel closure condition
July '06 (new)	Cherry Street	Travel time has increased significantly by 1:41 from the pre-tunnel closure condition
Jan '06	All other segments	During the PM period were less than 1 minute difference, and represent no significant change in operation.
July '06		There are no new variations in midday travel time data that appear to be significant

## Traffic Volumes and Turning Movement Counts

The following tables describe the change in traffic volumes based on the traffic counts recorded during the first two sets of post tunnel closure traffic statistics. The following tables illustrate a ranking of streets with the greatest volume change for both the PM Peak hour and the Average Weekday Daily Traffic (AWDT) from the Pre-tunnel closure condition, based on the Volume 2 Report that was issued in January, 2006.. The right-most column(s) on these tables summarize volume changes on these approaches compared to pre-tunnel condition for the October 2005 and May 2006 data collection effort.

**Table 2. PM Peak Period (4-6 pm) Traffic Volumes**

*Change to PM Peak hour volume as compared to pre-tunnel condition*

Location	Direction	Oct 2005	May 2006
2nd Ave north of Pine St	Southbound	increased by 207 vph (+18%)	increased by 175 vph (+15%)
6th Ave south of Olive Way	Northbound	increased by of 199 vph (+19%)	increased by of 56 vph (+5%)
6th Ave south of University St	Northbound	increased by 168 vph (+16%)	increased by 125 vph (+12%)
1st Ave south of Seneca St	Northbound	increased by of 98 vph (+14%)	increased by of 51 vph (+8%)
Stewart St east of 2nd Ave	Westbound	increased by of 97 vph (+16%)	increased by of 26 vph (+4%)
3rd Ave	NB/SB	dropped an average of 65%	dropped an average of 65%

**Table 3. AWDT (Average Weekday Daily Traffic) Variations from Pre-Tunnel Closure Conditions**

Location	Direction	October 2005	May 2006
3rd Avenue	NB/SB	Reduced daily traffic on average by 21%. Daily volumes dropped on average by 1,130 vehicles per day. The range was between 600 to 2,000 vehicles per day depending on location.	Reduced daily traffic on average by 23%. Daily volumes dropped on average by 1,250 vehicles per day. The range was between 600 to 2,000 vehicles per day depending on location.
2nd Ave north of Pine St	Southbound	Daily volumes increased the most of all locations. The increase was 3,128 vehicles per day (+22% of pre-tunnel AWDT).	Daily volumes increased the most of all locations. The increase was 1,986 vehicles per day (+14% of pre-tunnel AWDT).
Stewart Street east of 2 <sup>nd</sup> Ave	Westbound	Daily volumes increased by 1,188 vpd, or +17% of pre-tunnel AWDT.	Daily volumes increased by 680 vpd, or +9% of pre-tunnel AWDT.
6th Ave south of Olive Way	Northbound	Increase in daily traffic with up to an additional 2000 daily trips or +16%	Increase in daily traffic with an additional 578 daily trips or +5%
4th Ave between James and Union Streets.	Northbound	Increase of +6% with 1147 additional daily trips	Increase of +1% with 210 additional daily trips

**Table 4. Turning Movement Counts**

Report Date	Location	Direction	October 2005
Jan '06	4th Avenue	Northbound Thru	Some of the largest increases in turning movement counts were the northbound through movement along 4th Avenue with over 500 vph in the morning near Cherry, and 500 vph northbound in the afternoon near Union. This diversion from 3rd to 4th Avenues was anticipated, and this illustrates the effect of multiple high rise building garages in the between Cherry and Union Streets area.
July '06			4th Avenue continues to experience an increase in traffic. AM peak hour traffic less than reported in January, and is now only 265 vph more than the pre-tunnel closure condition at the intersection with Cherry St..
Jan '06	Stewart and 3rd Avenue	Southbound Right	Experienced an increase of more than 100 vph. An additional 123 vph during the PM peak hour.
July '06			The southbound right turn at this intersection is beginning to normalize to pre-tunnel closure conditions with only an additional 73 vph during the PM peak hour.
Jan '06	Spring and 2nd Avenue	Southbound left turn	Experienced an increase of more than 100 vph. 106 additional turns during the AM peak period.
July '06			157 trips additional turns were measured during the AM peak hour as compared to the pre-tunnel closure conditions.
July '06	Spring and 2nd Avenue	Southbound Thru	An additional 345 vph were measured at this location as compared to the pre-tunnel closure condition. This is an increase from the January '06 report where only an additional 150 vph were measured.
Jan '06	Lenora Street	Westbound	Some traffic appears to be avoiding Stewart and favoring westbound Lenora Street as an alternate route with an additional 97 trips in the AM and 160 trips in the PM peak hours.
July '06			Traffic on Lenora has dropped slightly from what was reported in January '06 with an additional 52 trips in the AM and 102 in the PM peak hours as compared to pre-tunnel closure conditions.
July '06	6th and University	NB Thru	The AM peak hour NB Thru movement was recorded as 358 vph more than pre-tunnel closure conditions.

Table 5 summarizes changes in PM peak hour and Average Weekday traffic counts for selected streets between pre-tunnel closure and October 2005 and between pre-tunnel closure and May 2006.

**Table 5. Changes in AWDT and PM Peak Traffic Volumes**

LOCATION	DIR FLOW	Jan-05		Oct-05		May-06		% Change Peak Hour Oct_05 to Jan_05	% Change AWDT Oct_05 to Jan_05	% Change Peak Hour Oct_05 to May_06	% Change AWDT Oct_05 to May_06
		PMPK	AWDT	PMPK	AWDT	PMPK	AWDT				
1ST AVE. NW/O CHERRY ST	South	610	6,645	436	6,467	652	6,502	-29%	-3%	7%	-2%
1ST AVE. NW/O SPRING ST	South	797	10,211	790	10,123	814	10,122	-1%	-1%	2%	-1%
2ND AVE. NW/O PIKE ST	South	1,339	16,831	1,232	15,333	1,394	17,536	-8%	-9%	4%	4%
2ND AVE. NW/O PINE ST	South	1,174	14,441	1,381	17,569	1,349	16,427	18%	22%	15%	14%
2ND AVE. NW/O VIRGINIA ST	South	1,038	12,429	990	13,013	753	12,021	-5%	5%	-27%	-3%
3RD AVE. NW/O LENORA ST	South	316	3,749	228	3,131	262	3,421	-28%	-16%	-17%	-9%
3RD AVE. NW/O PINE ST	South	447	4,684	296	3,612	287	3,630	-34%	-23%	-36%	-23%
3RD AVE. NW/O STEWART ST	South	356	4,095	260	3,331	276	3,388	-27%	-19%	-22%	-17%
3RD AVE. NW/O VIRGINIA ST	South	376	4,450	259	3,473	279	3,409	-31%	-22%	-26%	-23%
3RD AVE. SE/O JAMES ST	South	459	4,286	260	3,132	261	3,194	-43%	-27%	-43%	-25%
3RD AVE. SE/O UNION ST	South	478	6,297	358	4,282	335	4,062	-25%	-32%	-30%	-35%
5TH AVE S. N/O S JACKSON ST	South	600	5,626	640	6,497	588	6,387	7%	15%	-2%	14%
5TH AVE S. N/O S MAIN ST	South	561	5,590	572	6,171	583	6,413	2%	10%	4%	15%
5TH AVE S. S/O S WELLS ST	South	611	5,094	583	5,670	554	5,610	-5%	11%	-9%	10%
WESTERN AVE. NW/O YESLER WAY	South	262	2,301	256	2,304	277	2,473	-2%	0%	6%	7%
1ST AVE. SE/O COLUMBIA ST	North	550	7,430	593	7,968	587	8,115	8%	7%	7%	9%
1ST AVE. SE/O SENECA ST	North	677	7,661	775	8,403	728	8,291	14%	10%	8%	8%
3RD AVE. SE/O BLANCHARD ST	North	630	5,358	338	4,091	325	3,984	-46%	-24%	-48%	-26%
3RD AVE. SE/O UNION ST	North	405	4,871	341	4,275	333	4,270	-16%	-12%	-18%	-12%
3RD AVE. SE/O LENORA ST	North	692	6,189	391	4,829	406	5,022	-44%	-22%	-41%	-19%
3RD AVE. SE/O STEWART ST	North	692	6,667	396	5,550	381	5,174	-43%	-17%	-45%	-22%
3RD AVE. SE/O UNION ST	North	515	6,164	359	4,690	355	4,508	-30%	-24%	-31%	-27%
3RD AVE. SE/O VIRGINIA ST	North	655	5,901	335	4,751	337	4,611	-49%	-19%	-49%	-22%
4TH AVE S. S/O S JACKSON ST	North	1,218	13,926	1,041	12,068	1,093	12,379	-15%	-13%	-10%	-11%
4TH AVE. SE/O CHERRY ST	North	1,784	18,833	1,820	19,000	1,718	18,863	2%	1%	-4%	0%
4TH AVE. SE/O JAMES ST	North	1,523	15,698	1,554	16,456	1,461	15,715	2%	5%	-4%	0%
4TH AVE. SE/O UNION ST	North	1,808	19,236	1,900	20,383	1,827	19,446	5%	6%	1%	1%
5TH AVE S. S/O S WELLS ST	North	86	1,144	155	1,814	128	1,590	81%	59%	49%	39%
6TH AVE. SE/O OLIVE WAY	North	1,055	12,618	1,254	14,644	1,111	13,196	19%	16%	5%	5%
6TH AVE. SE/O UNIVERSITY ST	North	1,026	15,102	1,194	16,332	1,151	16,237	16%	8%	12%	8%
WESTERN AVE. SE/O COLUMBIA ST	North	208	1,587	211	1,637	201	1,662	1%	3%	-3%	5%
CHERRY ST. SW/O 3RD AVE	East	548	5,100	547	5,255	728	8,490	0%	3%	33%	66%
JAMES ST. SW/O 3RD AVE	East	313	2,759	363	3,115	360	3,005	16%	13%	15%	9%
SPRING ST. SW/O 3RD AVE	East	747	7,885	721	7,814	587	5,481	-3%	-1%	-21%	-30%
UNIVERSITY ST. SW/O 3RD AVE	East	445	5,626	507	6,508	484	6,369	14%	16%	9%	13%
JAMES ST. NE/O 2ND AVE	West	282	4,049	290	4,002	291	4,055	3%	-1%	3%	0%
LENORA ST. NE/O 2ND AVE	West	440	4,463	404	4,620	419	4,558	-8%	4%	-5%	2%
PINE ST. NE/O 2ND AVE	West	424	5,330	410	5,602	494	6,203	-3%	5%	17%	16%
STEWART ST. NE/O 2ND AVE	West	626	7,191	723	8,379	652	7,871	16%	17%	4%	9%
STEWART ST. NE/O 4TH AVE	West	785	10,869	819	11,756	772	11,302	4%	8%	-2%	4%

AWDT = Average Weekday Traffic count in vehicles per day

PMPK = PM peak hour traffic count in vehicles per hour

Table 6 summarizes traffic count information at selected intersections for the AM Peak, midday and PM peak for the three different data collection efforts, before tunnel closure in January 2005 and after tunnel closure in October 2005 and May 2006.

**Table 6. Traffic Turning Movement Volumes between Pre- and Post-Tunnel Closure Conditions**

*Underlined - pre-tunnel volumes that changed by more than +/-100 vph yellow - volume is 100+ vph greater than pre-tunnel closure conditions blue - volume is 100 - vph lower than pre-tunnel closure conditions not marked - volumes are within 100vph of pre-tunnel closure conditions.*

		Date	Time Period	NB Left	NB Thru	NB Right	SB Left	SBT Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
5th Ave	Main St	1/20/05	AM	0	0	0	18	296	13	0	14	18	15	63	0
5th Ave	Main St	1/20/05	MD	0	0	0	22	270	16	0	23	21	12	53	0
5th Ave	Main St	1/20/05	PM	0	0	0	14	530	18	0	35	26	24	60	0
5th Ave	Main St	10/26/05	AM	3	42	4	14	416	30	0	26	28	6	108	3
5th Ave	Main St	10/26/05	MD	1	24	3	20	350	12	0	24	36	10	60	6
5th Ave	Main St	10/26/05	PM	4	55	14	20	473	23	0	43	36	21	114	3
5th Ave	Main St	5/2/06	AM	2	38	0	29	395	22	0	38	25	9	71	2
5th Ave	Main St	5/2/06	MD	0	19	2	17	301	20	0	19	29	11	56	9
5th Ave	Main St	5/2/06	PM	1	45	6	36	516	15	0	50	43	19	119	3
4th (2nd) Ave S	S Jackson St	1/19/05	AM	0	<u>1429</u>	77	0	0	0	52	239	0	0	215	200
4th (2nd) Ave S	S Jackson St	1/19/05	MD	4	<u>579</u>	128	0	0	0	63	226	0	0	234	233
4th (2nd) Ave S	S Jackson St	1/19/05	PM	5	<u>827</u>	130	0	0	0	103	339	0	0	233	308
4th (2nd) Ave S	S Jackson St	10/18/05	AM	0	<u>1247</u>	61	0	0	0	56	218	0	0	238	198
4th (2nd) Ave S	S Jackson St	10/18/05	MD	0	615	90	0	0	0	63	238	0	0	313	242
4th (2nd) Ave S	S Jackson St	10/18/05	PM	0	772	103	0	0	0	101	326	0	0	285	267
4th (2nd) Ave S	S Jackson St	5/2/06	AM	0	1410	56	0	0	0	61	269	0	0	252	162
4th (2nd) Ave S	S Jackson St	5/2/06	MD	0	588	90	0	0	0	50	226	0	0	274	213
4th (2nd) Ave S	S Jackson St	5/2/06	PM	0	<u>975</u>	117	0	0	0	119	383	0	0	256	225
5th Ave S	S Washington	1/19/05	AM	0	0	0	15	307	62	0	20	12	13	49	0
5th Ave S	S Washington	1/19/05	MD	0	0	0	14	270	69	0	16	25	7	33	0
5th Ave S	S Washington	1/19/05	PM	0	0	0	22	476	64	0	16	36	17	58	0
5th Ave S	S Washington	10/27/05	AM	32	0	9	12	354	62	0	7	10	9	24	0
5th Ave S	S Washington	10/27/05	MD	8	0	33	20	342	101	0	15	26	7	38	0
5th Ave S	S Washington	10/27/05	PM	38	0	24	18	471	47	0	26	56	8	31	0
5th Ave S	S Washington	5/2/06	AM	37	0	9	20	389	102	0	24	7	18	40	0
5th Ave S	S Washington	5/2/06	MD	13	0	19	22	329	54	0	26	16	9	41	0
5th Ave S	S Washington	5/2/06	PM	41	0	11	21	464	34	0	65	26	11	52	0
4th Ave	James St	1/20/05	AM	25	1187	58	0	0	0	20	167	0	0	383	315
4th Ave	James St	1/20/05	MD	28	833	126	0	0	0	15	202	0	0	275	254
4th Ave	James St	1/20/05	PM	20	<u>1261</u>	129	0	0	0	30	224	0	0	302	355
4th Ave	James St	10/19/05	AM	46	1346	72	0	0	0	32	172	0	0	316	379
4th Ave	James St	10/19/05	MD	35	851	117	0	0	0	36	225	0	0	266	223
4th Ave	James St	10/19/05	PM	32	<u>1427</u>	97	0	0	0	54	298	0	0	301	364
4th Ave	James St	5/2/06	AM	49	1352	79	0	0	0	33	202	0	0	352	374
4th Ave	James St	5/2/06	MD	23	948	108	0	0	0	26	232	0	0	352	248
4th Ave	James St	5/2/06	PM	27	<u>1867</u>	145	0	0	0	44	321	0	0	248	307
4th Ave	Cherry St	1/27/05	AM	0	<u>1434</u>	132	0	0	0	97	248	0	0	0	0

		Date	Time Period	NB Left	NB Thru	NB Right	SB Left	SBT Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
4th Ave	Cherry St	1/27/05	MD	0	889	202	0	0	0	90	266	0	0	0	0
4th Ave	Cherry St	1/27/05	PM	0	1499	313	0	0	0	121	624	0	0	0	0
4th Ave	Cherry St	1/27/05	AM	0	2017	211	0	0	0	153	252	0	0	0	0
4th Ave	Cherry St	1/27/05	MD	0	1005	242	0	0	0	70	264	0	0	0	0
4th Ave	Cherry St	1/27/05	PM	0	1661	350	0	0	0	146	583	0	0	0	0
4th Ave	Cherry St	5/2/06	AM	0	1699	183	0	0	0	143	235	0	0	0	0
4th Ave	Cherry St	5/2/06	MD	0	978	239	0	0	0	92	273	0	0	0	0
4th Ave	Cherry St	5/2/06	PM	0	1575	433	0	0	0	151	559	0	0	0	0
4th Ave	Union St	1/25/05	AM	177	1221	0	0	0	0	0	0	0	0	584	175
4th Ave	Union St	1/25/05	MD	99	941	0	0	0	0	0	0	0	0	400	187
4th Ave	Union St	1/25/05	PM	146	1352	0	0	0	0	0	0	0	0	634	220
4th Ave	Union St	10/19/05	AM	203	1392	0	0	0	0	0	0	0	0	602	213
4th Ave	Union St	10/19/05	MD	105	1031	0	0	0	0	0	0	0	0	401	179
4th Ave	Union St	10/19/05	PM	188	1888	0	0	0	0	0	0	0	0	583	242
4th Ave	Union St	5/2/06	AM	256	1504	0	0	0	0	0	0	0	0	595	161
4th Ave	Union St	5/2/06	MD	166	1185	0	0	0	0	0	0	0	0	585	203
4th Ave	Union St	5/2/06	PM	192	1993	0	0	0	0	0	0	0	0	539	271
6th Ave	University St	1/20/05	AM	0	1132	304	0	0	0	277	294	0	0	0	51
6th Ave	University St	1/20/05	MD	0	564	302	0	0	0	244	345	0	0	0	57
6th Ave	University St	1/20/05	PM	0	668	339	0	0	0	319	475	0	0	0	79
6th Ave	University St	10/25/05	AM	0	1011	259	0	0	0	326	221	0	0	0	58
6th Ave	University St	10/25/05	MD	0	596	281	0	0	0	278	319	0	0	0	55
6th Ave	University St	10/25/05	PM	0	799	319	0	0	0	400	449	0	0	0	168
6th Ave	University St	5/2/06	AM	0	1490	163	0	0	0	297	376	0	0	0	62
6th Ave	University St	5/2/06	MD	0	617	283	0	0	0	238	391	0	0	0	41
6th Ave	University St	5/2/06	PM	0	959	325	0	0	0	366	472	0	0	0	132
6th Ave	Olive Way	1/26/05	AM	0	562	257	0	0	0	77	328	0	0	0	0
6th Ave	Olive Way	1/26/05	MD	0	599	273	0	0	0	79	378	0	0	0	0
6th Ave	Olive Way	1/26/05	PM	0	825	366	0	0	0	87	423	0	0	0	0
6th Ave	Olive Way	10/26/05	AM	0	572	258	0	0	0	61	436	0	0	0	0
6th Ave	Olive Way	10/26/05	MD	0	542	298	0	0	0	63	371	0	0	0	0
6th Ave	Olive Way	10/26/05	PM	0	924	424	0	0	0	110	580	0	0	0	0
6th Ave	Olive Way	5/2/06	AM	0	575	235	0	0	0	50	427	0	0	0	0
6th Ave	Olive Way	5/2/06	MD	0	504	301	0	0	0	70	409	0	0	0	0
6th Ave	Olive Way	5/2/06	PM	0	916	437	0	0	0	100	623	0	0	0	0
2nd Ave	James St	1/25/05	AM	0	0	0	88	640	106	0	96	14	97	232	0
2nd Ave	James St	1/25/05	MD	0	0	0	62	507	74	0	80	9	64	168	0
2nd Ave	James St	1/25/05	PM	0	0	0	134	947	65	0	188	22	49	159	0
2nd Ave	James St	10/25/05	AM	0	0	0	98	674	91	0	91	11	74	209	0
2nd Ave	James St	10/25/05	MD	0	0	0	73	523	85	0	105	12	68	198	0
2nd Ave	James St	10/25/05	PM	0	0	0	159	880	50	0	230	20	46	217	0
2nd Ave	James St	5/2/06	AM	0	0	0	86	619	96	0	81	10	91	249	0
2nd Ave	James St	5/2/06	MD	0	0	0	86	524	60	0	93	16	57	175	0
2nd Ave	James St	5/2/06	PM	0	0	0	128	908	53	0	194	17	52	193	0
2nd Ave	Cherry St	1/26/05	AM	0	0	0	200	743	0	0	139	40	0	0	0



		Date	Time Period	NB Left	NB Thru	NB Right	SB Left	SBT Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
2nd Ave	Cherry St	1/26/05	MD	0	0	0	153	<u>544</u>	0	0	104	42	0	0	0
2nd Ave	Cherry St	1/26/05	PM	0	0	0	312	<u>1009</u>	0	0	<u>345</u>	91	0	0	0
2nd Ave	Cherry St	10/26/05	AM	0	0	0	245	831	0	0	140	40	0	0	0
2nd Ave	Cherry St	10/26/05	MD	0	0	0	167	<u>652</u>	0	0	116	54	0	0	0
2nd Ave	Cherry St	10/26/05	PM	0	0	0	265	<u>1112</u>	0	0	295	63	0	0	0
2nd Ave	Cherry St	5/2/06	AM	0	0	0	233	781	0	0	150	38	0	0	0
2nd Ave	Cherry St	5/2/06	MD	0	0	0	136	<u>646</u>	0	0	131	56	0	0	0
2nd Ave	Cherry St	5/2/06	PM	0	0	0	264	934	0	0	<u>218</u>	54	0	0	0
2nd Ave	Spring St	1/26/05	AM	0	0	0	<u>226</u>	<u>1021</u>	0	0	266	43	0	0	0
2nd Ave	Spring St	1/26/05	MD	0	0	0	<u>215</u>	<u>728</u>	0	0	217	59	0	0	0
2nd Ave	Spring St	1/26/05	PM	0	0	0	243	<u>1127</u>	0	0	272	114	0	0	0
2nd Ave	Spring St	11/1/05	AM	0	0	0	332	<u>1229</u>	0	0	279	52	0	0	0
2nd Ave	Spring St	11/1/05	MD	0	0	0	229	<u>873</u>	0	0	211	63	0	0	0
2nd Ave	Spring St	11/1/05	PM	0	0	0	292	<u>1277</u>	0	0	303	112	0	0	0
2nd Ave	Spring St	5/2/06	AM	0	0	0	<u>383</u>	<u>1271</u>	0	0	277	102	0	0	0
2nd Ave	Spring St	5/2/06	MD	0	0	0	<u>253</u>	<u>951</u>	0	0	296	54	0	0	0
2nd Ave	Spring St	5/2/06	PM	0	0	0	305	<u>1472</u>	0	0	289	124	0	0	0
2nd Ave	University St	1/25/05	AM	0	0	0	148	<u>1014</u>	0	0	273	17	0	0	0
2nd Ave	University St	1/25/05	MD	0	0	0	114	<u>717</u>	0	0	152	30	0	0	0
2nd Ave	University St	1/25/05	PM	0	0	0	161	<u>994</u>	0	0	229	30	0	0	0
2nd Ave	University St	11/2/05	AM	0	0	0	189	<u>1205</u>	0	0	276	18	0	0	0
2nd Ave	University St	11/2/05	MD	0	0	0	123	<u>834</u>	0	0	204	40	0	0	0
2nd Ave	University St	11/2/05	PM	0	0	0	217	<u>1128</u>	0	0	233	36	0	0	0
2nd Ave	University St	5/2/06	AM	0	0	0	237	<u>1408</u>	0	0	301	15	0	0	0
2nd Ave	University St	5/2/06	MD	0	0	0	181	<u>836</u>	0	0	200	35	0	0	0
2nd Ave	University St	5/2/06	PM	0	0	0	194	<u>1378</u>	0	0	292	41	0	0	0
3rd Ave	Pine St	1/27/05	AM	39	<u>378</u>	0	0	<u>339</u>	6	0	0	0	17	244	32
3rd Ave	Pine St	1/27/05	MD	32	297	0	0	253	14	0	0	0	15	292	23
3rd Ave	Pine St	1/27/05	PM	26	<u>680</u>	0	0	<u>419</u>	42	0	0	0	21	<u>329</u>	58
3rd Ave	Pine St	10/27/05	AM	3	<u>181</u>	0	0	<u>107</u>	2	0	0	0	7	262	32
3rd Ave	Pine St	10/27/05	MD	29	351	0	0	262	16	0	0	0	18	336	27
3rd Ave	Pine St	10/27/05	PM	4	<u>258</u>	0	0	<u>150</u>	45	0	0	0	10	388	32
3rd Ave	Pine St	5/2/06	AM	1	<u>140</u>	0	0	<u>83</u>	4	0	0	0	4	246	28
3rd Ave	Pine St	5/2/06	MD	24	227	0	0	227	24	0	0	0	7	293	28
3rd Ave	Pine St	5/2/06	PM	9	<u>188</u>	0	0	<u>181</u>	59	0	0	0	5	<u>459</u>	47
3rd Ave	Stewart St	2/2/05	AM	53	<u>266</u>	72	0	<u>240</u>	61	0	0	0	68	624	95
3rd Ave	Stewart St	2/2/05	MD	29	269	59	0	226	35	0	0	0	60	375	66
3rd Ave	Stewart St	2/2/05	PM	10	<u>633</u>	125	0	297	<u>68</u>	0	0	0	104	<u>444</u>	85
3rd Ave	Stewart St	11/1/05	AM	8	<u>111</u>	36	0	<u>43</u>	126	0	0	0	50	564	106
3rd Ave	Stewart St	11/1/05	MD	28	191	33	0	142	45	0	0	0	43	269	20
3rd Ave	Stewart St	11/1/05	PM	1	<u>219</u>	51	0	57	<u>191</u>	0	0	0	62	<u>328</u>	29
3rd Ave	Stewart St	5/2/06	AM	3	<u>141</u>	53	0	<u>79</u>	122	0	0	0	59	650	100
3rd Ave	Stewart St	5/2/06	MD	30	229	61	0	153	42	0	0	0	69	371	38
3rd Ave	Stewart St	5/2/06	PM	10	<u>188</u>	28	0	153	141	0	0	0	69	386	34
3rd Ave	Virginia St	1/27/05	AM	0	<u>200</u>	31	39	<u>250</u>	0	27	271	56	0	0	0

		Date	Time Period	NB Left	NB Thru	NB Right	SB Left	SBT Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
3rd Ave	Virginia St	1/27/05	MD	0	199	36	50	168	0	67	302	45	0	0	0
3rd Ave	Virginia St	1/27/05	PM	0	<u>480</u>	119	63	256	0	67	445	45	0	0	0
3rd Ave	Virginia St	11/3/05	AM	0	116	49	41	119	0	25	307	65	0	0	0
3rd Ave	Virginia St	11/3/05	MD	0	216	80	48	172	0	58	311	50	0	0	0
3rd Ave	Virginia St	11/3/05	PM	0	271	137	72	183	0	69	543	37	0	0	0
3rd Ave	Virginia St	5/2/06	AM	0	84	58	30	119	0	36	279	63	0	0	0
3rd Ave	Virginia St	5/2/06	MD	0	210	77	41	165	0	43	309	22	0	0	0
3rd Ave	Virginia St	5/2/06	PM	0	205	140	64	158	0	56	459	46	0	0	0
3rd Ave	Lenora St	2/1/05	AM	39	<u>185</u>	0	0	262	28	0	0	0	28	120	38
3rd Ave	Lenora St	2/1/05	MD	38	215	0	0	187	30	0	0	0	55	128	33
3rd Ave	Lenora St	2/1/05	PM	102	<u>453</u>	0	0	200	23	0	0	0	59	<u>165</u>	69
3rd Ave	Lenora St	11/1/05	AM	30	89	0	0	156	28	0	0	0	32	217	37
3rd Ave	Lenora St	11/1/05	MD	41	183	0	0	143	26	0	0	0	42	124	30
3rd Ave	Lenora St	11/1/05	PM	52	205	0	0	149	38	0	0	0	66	327	65
3rd Ave	Lenora St	5/2/06	AM	29	83	0	0	165	29	0	0	0	24	172	36
3rd Ave	Lenora St	5/2/06	MD	66	206	0	0	177	24	0	0	0	57	155	37
3rd Ave	Lenora St	5/2/06	PM	52	219	0	0	126	15	0	0	0	75	267	89
2nd Ave	Lenora St	2/1/05	AM	0	0	0	0	<u>1181</u>	38	0	0	0	93	110	0
2nd Ave	Lenora St	2/1/05	MD	0	0	0	0	587	71	0	0	0	101	122	0
2nd Ave	Lenora St	2/1/05	PM	0	0	0	0	<u>741</u>	83	0	0	0	199	188	0
2nd Ave	Lenora St	11/1/05	AM	0	0	0	0	1241	56	0	0	0	101	100	0
2nd Ave	Lenora St	11/1/05	MD	0	0	0	0	558	52	0	0	0	104	143	0
2nd Ave	Lenora St	11/1/05	PM	0	0	0	0	794	100	0	0	0	195	229	0
2nd Ave	Lenora St	5/2/06	AM	0	0	0	0	1332	47	0	0	0	90	108	0
2nd Ave	Lenora St	5/2/06	MD	0	0	0	0	633	53	0	0	0	117	129	0
2nd Ave	Lenora St	5/2/06	PM	0	0	0	0	945	176	0	0	0	255	236	0
2nd Ave	Stewart St	2/3/05	AM	0	0	0	0	<u>1183</u>	34	0	0	0	250	221	0
2nd Ave	Stewart St	2/3/05	MD	0	0	0	0	632	84	0	0	0	185	229	0
2nd Ave	Stewart St	2/3/05	PM	0	0	0	0	976	147	0	0	0	<u>298</u>	<u>340</u>	0
2nd Ave	Stewart St	11/3/05	AM	0	0	0	0	1346	41	0	0	0	332	242	0
2nd Ave	Stewart St	11/3/05	MD	0	0	0	0	593	64	0	0	0	209	242	0
2nd Ave	Stewart St	11/3/05	PM	0	0	0	0	931	129	0	0	0	404	371	0
2nd Ave	Stewart St	5/2/06	AM	0	0	0	0	1274	39	0	0	0	263	211	0
2nd Ave	Stewart St	5/2/06	MD	0	0	0	0	679	52	0	0	0	176	227	0
2nd Ave	Stewart St	5/2/06	PM	0	0	0	0	992	72	0	0	0	344	230	0
2nd Ave	Pine St	2/3/05	AM	0	0	0	0	<u>1210</u>	14	0	0	0	139	100	0
2nd Ave	Pine St	2/3/05	MD	0	0	0	0	<u>674</u>	34	0	0	0	151	120	0
2nd Ave	Pine St	2/3/05	PM	0	0	0	0	<u>1033</u>	41	0	0	0	<u>179</u>	<u>159</u>	0
2nd Ave	Pine St	2/3/05	AM	0	0	0	0	1484	21	0	0	0	162	92	0
2nd Ave	Pine St	2/3/05	MD	0	0	0	0	858	30	0	0	0	169	139	0
2nd Ave	Pine St	2/3/05	PM	0	0	0	0	1132	30	0	0	0	195	174	0
2nd Ave	Pine St	5/2/06	AM	0	0	0	0	1688	18	0	0	0	155	109	0
2nd Ave	Pine St	5/2/06	MD	0	0	0	0	729	45	0	0	0	144	45	0
2nd Ave	Pine St	5/2/06	PM	0	0	0	0	1265	20	0	0	0	396	265	0
1st Ave	Spring St	2/2/05	AM	0	<u>446</u>	93	124	<u>416</u>	0	42	165	41	0	0	0

		Date	Time Period	NB Left	NB Thru	NB Right	SB Left	SBT Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right
1st Ave	Spring St	2/2/05	MD	0	427	68	55	523	0	17	147	52	0	0	0
1st Ave	Spring St	2/2/05	PM	0	<u>595</u>	90	128	<u>889</u>	0	73	207	113	0	0	0
1st Ave	Spring St	11/2/05	AM	0	647	95	116	476	0	38	156	62	0	0	0
1st Ave	Spring St	11/2/05	MD	0	402	73	64	473	0	26	164	49	0	0	0
1st Ave	Spring St	11/2/05	PM	0	786	63	71	655	0	65	193	76	0	0	0
1st Ave	Spring St	5/2/06	AM	0	626	140	139	617	0	40	169	43	0	0	0
1st Ave	Spring St	5/2/06	MD	0	414	75	51	488	0	28	144	53	0	0	0
1st Ave	Spring St	5/2/06	PM	0	719	60	65	737	0	52	182	86	0	0	0
1st Ave	Columbia St	2/2/05	AM	53	<u>498</u>	0	0	295	97	0	0	0	131	325	124
1st Ave	Columbia St	2/2/05	MD	71	348	0	0	286	148	0	0	0	54	362	98
1st Ave	Columbia St	2/2/05	PM	95	527	0	0	380	331	0	0	0	43	<u>1272</u>	114
1st Ave	Columbia St	11/3/05	AM	54	656	0	0	314	109	0	0	0	140	277	143
1st Ave	Columbia St	11/3/05	MD	56	392	0	0	342	171	0	0	0	58	322	99
1st Ave	Columbia St	11/3/05	PM	89	553	0	0	360	318	0	0	0	58	930	153
1st Ave	Columbia St	5/2/06	AM	72	590	0	0	335	126	0	0	0	140	370	148
1st Ave	Columbia St	5/2/06	MD	62	422	0	0	326	168	0	0	0	59	339	102
1st Ave	Columbia St	5/2/06	PM	176	538	0	0	371	326	0	0	0	54	982	94
Western Ave	Yesler Way	2/2/05	AM	0	0	0	146	0	15	61	102	0	0	65	82
Western Ave	Yesler Way	2/2/05	MD	0	0	0	106	0	22	35	74	0	0	83	50
Western Ave	Yesler Way	2/2/05	PM	0	0	0	194	0	15	92	87	0	0	97	127
Western Ave	Yesler Way	11/8/05	AM	0	0	0	170	0	9	62	82	0	0	70	76
Western Ave	Yesler Way	11/8/05	MD	0	0	0	139	0	16	37	73	0	0	88	56
Western Ave	Yesler Way	11/8/05	PM	0	0	0	257	0	21	67	131	0	0	131	113
Western Ave	Yesler Way	5/2/06	AM	0	0	0	162	0	13	77	87	0	0	64	101
Western Ave	Yesler Way	5/2/06	MD	0	0	0	119	0	27	45	86	0	0	67	64
Western Ave	Yesler Way	5/2/06	PM	0	0	0	247	0	38	err	165	0	0	142	151
3rd Ave	Yesler Way	2/1/05	AM	43	132	9	58	57	20	16	162	16	29	208	169
3rd Ave	Yesler Way	2/1/05	MD	18	60	2	72	62	37	34	117	12	15	125	133
3rd Ave	Yesler Way	2/1/05	PM	20	91	4	<u>160</u>	96	33	25	129	9	17	217	<u>243</u>
3rd Ave	Yesler Way	10/27/05	AM	2	62	0	55	55	19	18	129	26	27	214	111
3rd Ave	Yesler Way	10/27/05	MD	15	80	4	62	79	42	38	106	6	28	115	169
3rd Ave	Yesler Way	10/27/05	PM	0	93	0	52	80	10	20	221	8	14	212	157
3rd Ave	Yesler Way	5/2/06	AM	7	79	2	47	56	11	15	161	20	125	233	125
3rd Ave	Yesler Way	5/2/06	MD	14	95	4	95	81	17	24	105	7	25	123	129
3rd Ave	Yesler Way	5/2/06	PM	0	125	7	184	80	3	18	184	8	20	207	135

## Travel Time for General Purpose Traffic

Figures 5A, 3B, and 3C illustrate travel time along selected segments for before and after tunnel closure. After tunnel closure travel time surveys were conducted in October 2005 and May 2006.

Figure 5A. General Purpose Travel Time AM Peak (7 – 9 am)

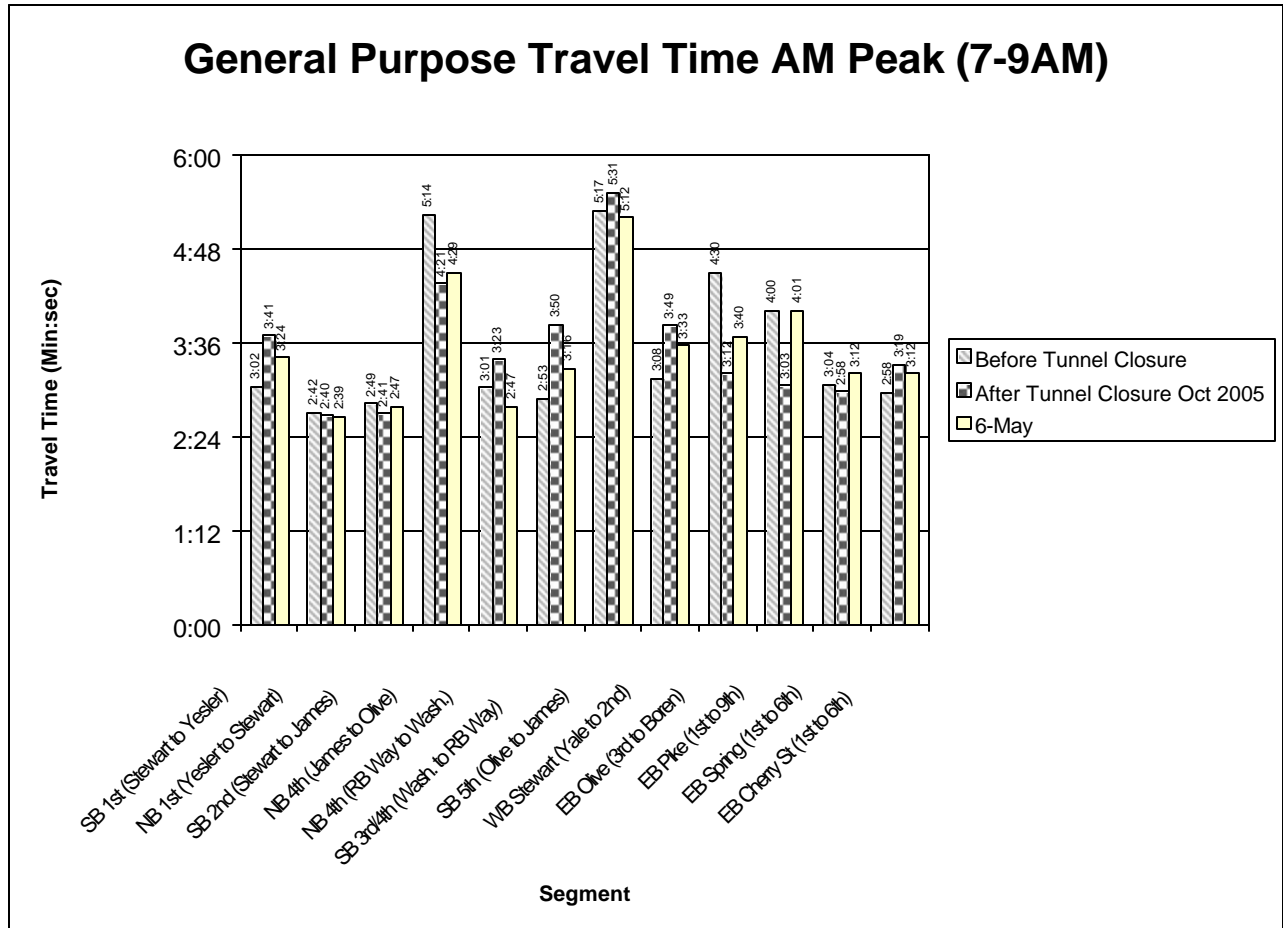


Figure 5B. General Purpose Travel Time PM Peak (4-6 pm)

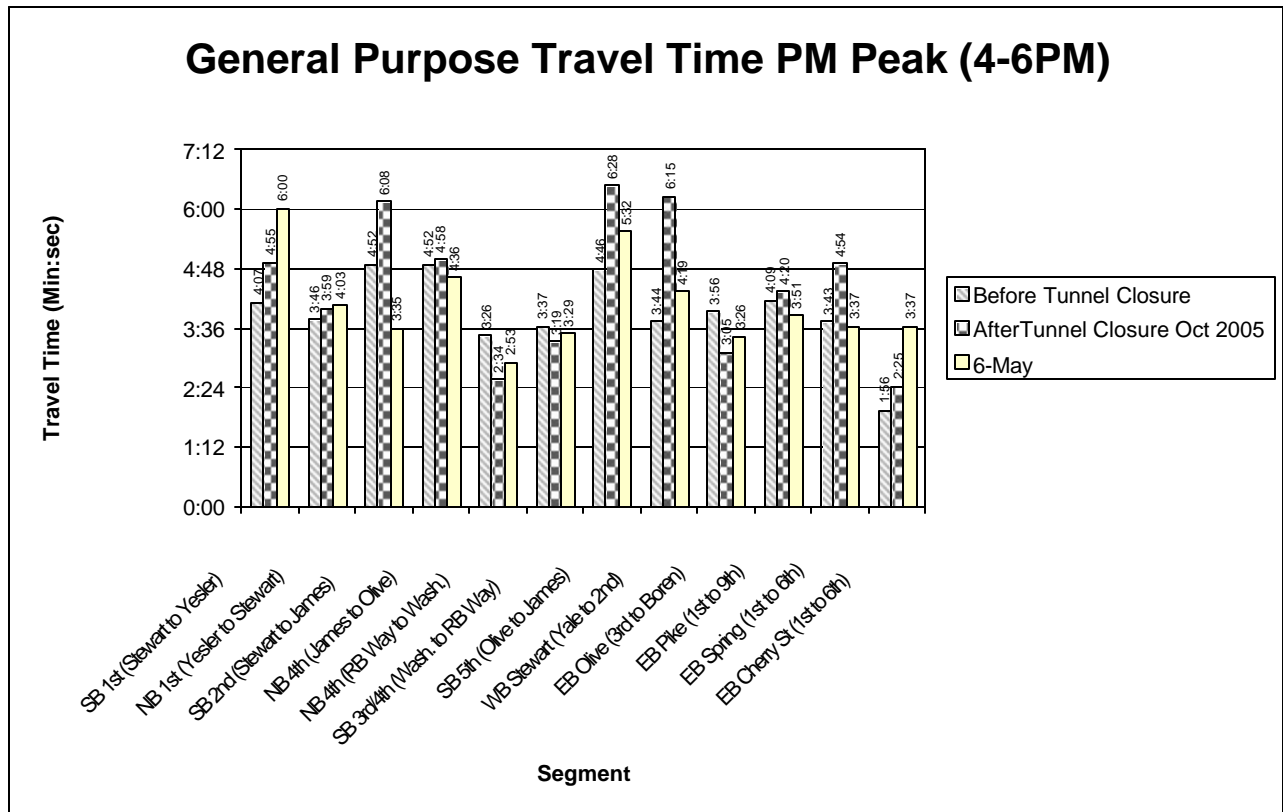


Figure 5C. General Purpose Travel Time Off-Peak (1-3 pm)

